

**WHAT IS CLAIMED IS:**

**1. A co-generated power supply system for performing co-generated power supply to a load for both of an AC and a DC by the use of at least one of a wind turbine generator, a solar cell and a fuel cell, a storage battery and a commercial AC power source, wherein:**

**the wind turbine generator, the solar cell and the fuel cell are used as DC power sources, each having a rated voltage made equal to a rated voltage of the storage battery;**

**AC power from the commercial AC power source is supplied to the load for both of the AC and the DC until the storage battery is fully charged by the DC power sources;**

**DC power from the storage battery is supplied to the load for both of the AC and the DC when the storage battery has been fully charged; and**

**the AC power from the commercial AC power source is supplied to the load for both of the AC and the DC as the storage battery approaches the terminal period of discharging.**

**2. A co-generated power supply system for performing co-generated power supply to a load for both of an AC and a DC via or not via a two-winding electronic transformer by the use of at least one of a wind turbine generator, a solar cell and a fuel cell, a storage battery and a commercial AC power source, wherein:**

**the wind turbine generator, the solar cell and the fuel cell are used as DC power sources, each having a rated voltage made equal to a rated voltage of the storage battery;**

**the two-winding electronic transformer has two bidirectional input/output**

**terminals for both of the AC and the DC;**

**one of the bidirectional input/output terminals in the two-winding electronic transformer is connected to an output side of a DC power source while the other bidirectional input/output terminal is connected in a T-shaped manner between the commercial AC power source and the load for both of the AC and the DC;**

**AC power from the commercial AC power source is supplied to the load for both of the AC and the DC not via the two-winding electronic transformer until the storage battery is fully charged by the DC power sources;**

**DC power from the DC power sources and the storage battery is supplied to the load for both of the AC and the DC via the two-winding electronic transformer when the storage battery has been fully charged or the commercial AC power source fails;**

**the electric power is replenished from the fuel cell when the storage battery is being discharged; and**

**the AC power is supplied to the load for both of the AC and the DC from the commercial AC power source in a time zone of nighttime and midnight power supply, and further, the storage battery is charged by the bidirectional function and the AC/DC converting function of the two-winding electronic transformer.**

**3. A co-generated power supply system for performing co-generated power supply to a load for both of an AC and a DC via a three-winding electronic transformer by the use of at least one of a wind turbine generator, a solar cell and a fuel cell, a storage battery and a commercial AC power source, wherein:**

**the wind turbine generator, the solar cell and the fuel cell are used as DC power sources, each having a rated voltage made equal to a rated voltage of the storage battery;**

the three-winding electronic transformer has three bidirectional input/output terminals for both of the AC and the DC;

the DC power sources and the storage battery, the commercial AC power source and the load for both of the AC and the DC are connected in a mutually insulating manner via the three-winding electronic transformer;

AC power from the commercial AC power source is supplied to the load for both of the AC and the DC via the three-winding electronic transformer until the storage battery is fully charged by the DC power sources;

DC power from the DC power sources and the storage battery is supplied to the load for both of the AC and the DC via the three-winding electronic transformer when the storage battery has been fully charged or the commercial AC power source fails;

the electric power is replenished from the fuel cell when the storage battery is being discharged; and

the AC power from the commercial AC power source is supplied to the load for both of the AC and the DC in a time zone of nighttime and midnight electric power supply, and further, the storage battery is charged by the bidirectional function and the AC/DC converting function of the three-winding electronic transformer.

4. A co-generated power supply system for performing co-generated power supply to a load only for an AC via or not via a bidirectional DC-DC converter and a two-winding electronic transformer by the use of at least one of a wind turbine generator, a solar cell and a fuel cell, a storage battery and a commercial AC power source, wherein:

the wind turbine generator, the solar cell and the fuel cell are used as DC power sources, each having a rated voltage made equal to a rated voltage of the

**storage battery;**

**the two-winding electronic transformer has two bidirectional input/output terminals for both of the AC and the DC and also has a high frequency transformer and modulation/demodulation semiconductor switches provided at the storage battery side and the load side of the high frequency transformer;**

**one of the bidirectional input/output terminals in the two-winding electronic transformer is connected to an output side of the DC power source while the other bidirectional input/output terminal is connected in a T-shaped manner between the commercial AC power source and the load only for the AC;**

**AC power from the commercial AC power source is supplied to the load only for the AC via neither the bidirectional DC-DC converter nor the two-winding electronic transformer until the storage battery is fully charged by the DC power sources;**

**DC power from the DC power source and the storage battery is supplied to the load only for the AC when the storage battery has been fully charged or the commercial AC power source fails by converting the DC power from the DC power source and the storage battery into a single-phase full-wave rectification waveform by half cycle sinusoidal wave modulation in the bidirectional DC-DC converter, alternately reversing a high frequency modulation phase of two or two pairs of unidirectional semiconductor switches, which constitute the modulation/demodulation semiconductor switch disposed on the side of the storage battery in a high frequency transformer in the two-winding electronic transformer, per half cycle of a commercial frequency, and then, demodulating to take out a sinusoidal wave AC output by the modulation/demodulation semiconductor switch disposed on the side of the load in the high frequency transformer in the two-winding electronic transformer;**

the electric power is replenished from the fuel cell when the storage battery is being discharged;

the AC power from the commercial AC power source is supplied to the load only for the AC in a time zone of nighttime and midnight electric power supply, and further, the storage battery is charged by the bidirectional function and the AC/DC converting function of the two-winding electronic transformer and a boost type rectifying operation at a high power factor of the bidirectional DC-DC converter at the time of charging; and

the DC power is converted into the AC power by the effect of the energy bidirectional transmitting characteristics of the two-winding electronic transformer when the storage battery has been almost fully charged at a light load and the commercial AC power source does not fail, for automatic phase synchronization on the commercial AC power source side so as to achieve a reverse flow of the AC current.

5. A co-generated power supply system for performing co-generated power supply to a load only for an AC via a bidirectional DC-DC converter and a three-winding electronic transformer by the use of at least one of a wind turbine generator, a solar cell and a fuel cell, a storage battery and a commercial AC power source, wherein:

the wind turbine generator, the solar cell and the fuel cell are used as DC power sources, each having a rated voltage made equal to a rated voltage of the storage battery;

the three-winding electronic transformer has three bidirectional input/output terminals for both of the AC and the DC and also has a high frequency transformer and modulation/demodulation semiconductor switches provided at the commercial AC power source side, the storage battery side and the

**load side of the high frequency transformer;**

**the DC power sources, the storage battery, the commercial AC power source and the load only for the AC are connected in a mutually insulating manner via the three-winding electronic transformer;**

**AC power from the commercial AC power source is supplied to the load only for the AC via the three-winding electronic transformer until the storage battery is fully charged by the DC power sources;**

**DC power from the DC power sources and the storage battery is supplied to the load only for the AC when the storage battery has been fully charged or the commercial AC power source fails by converting the DC power from the DC power source and the storage battery into a single-phase full-wave rectification waveform by half cycle sinusoidal wave modulation in the bidirectional DC-DC converter, alternately reversing a high frequency modulation phase of two or two pairs of unidirectional semiconductor switches, which constitute the modulation/demodulation semiconductor switch disposed on the side of the storage battery in a high frequency transformer in the three-winding electronic transformer, per half cycle of a commercial frequency, and then, demodulating to take out a sinusoidal wave AC output by the modulation/demodulation semiconductor switch disposed on the side of the load in the high frequency transformer in the three-winding electronic transformer;**

**the electric power is replenished from the fuel cell when the storage battery is being discharged;**

**the AC power from the commercial AC power source is supplied to the load only for the AC in a time zone of nighttime and midnight electric power supply, and further, the storage battery is charged by the bidirectional function and the AC/DC converting function of the three-winding electronic transformer**

**and a boost type rectifying operation at a high power factor of the bidirectional DC-DC converter at the time of electric charging; and**

**the DC power is converted into the AC power by the energy bidirectional transmitting characteristics of the three-winding electronic transformer when the storage battery has been almost fully charged at a light load and the commercial AC power source does not fail, for automatic phase synchronization on the side of the commercial AC power source so as to achieve a reverse flow of the AC current.**

**6. The co-generated power supply system as claimed in any one of claims 1 to 5, wherein compressed hydrogen for the fuel cell can be reserved.**